

Tunable dual-band metamaterial using open stub-loaded stepped-impedance resonator

ABSTRACT

In this paper, we report a tunable planar metamaterial that is designed to achieve dual-band negative refractive index response in microwave regime. Its distinctive characteristic is the usage of tuning open stub-loaded stepped-impedance resonators. The frequency tunability of the second band is achievable via the adjustable open stub-loaded at the fixed tune of the first band. Parameter retrieval algorithm and full-wave simulation of prism-shaped structure were carried out to validate the negative refraction characteristics of metamaterial structure. The results predict its prospect as a very promising alternative to the conventional ones, which is compatibly applicable on various potential microwave devices especially when a dual-band function is required. In addition to that, its design flexibility offers various frequency bands at any possible choice, which alterable with the design parameters.

Keyword: Metamaterial; Dual-band negative refractive inde; Open stub-loaded; Stepped-impedance resonator